

Engineering Courses

Tier 1 – Foundation Courses	
Introduction to Engineering Design	In this course, students use 3D solid modeling design software to help them design solutions to solve proposed problems. Students will learn how to document their work and communicate solutions to peers and members of the professional community. This course is designed for 9th or 10th grade students. The major focus of the IED course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards and technical documentation.
Principles of Engineering	This survey course of engineering exposes students to some of the major concepts they'll encounter in a postsecondary engineering course of study. Students have an opportunity to investigate engineering and high-tech careers and to develop skills and understanding of course concepts. Students employ engineering and scientific concepts in the solution of engineering design problems. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students also learn how to document their work and communicate their solutions to peers and members of the professional community. This course is designed for 10th or 11th grade students.

Tier 2 – Specialization Courses	
Aerospace Engineering	The major focus of this course is to expose students to the world of aeronautics, flight and engineering through the fields of aeronautics, aerospace engineering and related areas of study. Lessons engage students in engineering design problems related to aerospace information systems, astronautics, rocketry, propulsion, the physics of space science, space life sciences, the biology of space science, principles of aeronautics, structures and materials, and systems engineering. Students work in teams utilizing hands-on activities, projects and problems and are exposed to various situations faced by aerospace engineers. In addition, students use 3D design software to help design solutions to proposed problems. Students design intelligent vehicles to learn about documenting their project, solving problems and communicating their solutions to their peers and members of the professional community. This course is designed for 11th or 12th grade students.
Biotechnical Engineering	The major focus of this course is to expose students to the diverse fields of biotechnology including biomedical engineering, molecular genetics, bioprocess engineering, and agricultural and environmental engineering. Lessons engage students in engineering design problems related to biomechanics, cardiovascular engineering, genetic engineering, agricultural biotechnology, tissue engineering, biomedical devices, forensics and bioethics. Students in this course apply biological and engineering concepts to design materials and processes that directly measure, repair, improve and extend living systems. The BE course is designed for 11th or 12th grade students.
Civil Engineering & Architecture	The major focus of this course is completing long-term projects that involve the development of property sites. As students learn about various aspects of civil engineering and architecture, they apply what they learn to the design and development of a property. The course provides teachers and students freedom to develop the property as a simulation or for students to model the experiences that civil engineers and architects face. Students work in teams, exploring hands-on activities and projects to learn the characteristics of civil engineering and architecture. In addition, students use 3D design software to help them design solutions to solve major course projects. Students learn about documenting their project, solving problems and communicating their solutions to their peers and members of the professional community of civil engineering and architecture. This course is designed for 11th or 12th grade students.

Tier 2 – Specialization Courses, cont.	
Computer Integrated Manufacturing	The major focus of this course is to answer questions such as: How are things made? What processes go into creating products? Is the process for making a water bottle the same as it is for a musical instrument? How do assembly lines work? How has automation changed the face of manufacturing? As students find the answers to these questions, they learn about the history of manufacturing, a sampling of manufacturing processes, robotics and automation. The course is built around several key concepts: computer modeling, Computer Numeric Control (CNC) equipment, Computer Aided Manufacturing (CAM) software, robotics and flexible manufacturing systems. This course is designed for 10th, 11th or 12th grade students.
Digital Electronics	This course is the study of electronic circuits that are used to process and control digital signals. Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras and high-definition televisions. The major focus of the DE course is to expose students to the process of combinational and sequential logic design, teamwork, communication methods, engineering standards and technical documentation. This course is designed for 10th or 11th grade students.

Tier 3 – Capstone Course	
Engineering Design & Development	This capstone course allows students to design a solution to a technical problem of their choosing. They have the chance to eliminate one of the “Don’t you hate it when...” statements of the world. This is an engineering research course in which students will work in teams to research, design, test and construct a solution to an open-ended engineering problem. The product development life cycle and a design process are used to guide and help the team to reach a solution to the problem. The team presents and defends their solution to a panel of outside reviewers at the conclusion of the course. The EDD course allows students to apply all the skills and knowledge learned in previous Project Lead The Way courses. The use of 3D design software helps students design solutions to the problem their team has chosen. This course also engages students in time management and teamwork skills, a valuable set for students in the future. This course is designed for 12th grade students.